CLAIMS

1. Apparatus for retrieving a tissue volume, comprising:

a delivery member having an interior channel extending from a proximal portion along a longitudinal axis to a forward region having a distal end;

a capture component positioned at said delivery member forward region, having a forward portion extending to a forwardly disposed tip region and pursing cable assembly energizable to define an electrosurgical cutting leading portion, said cable assembly including one or more tensionable cables extending from said forward portion along said interior channel to a cable terminator, said forward portion being drivably extendable from an initial position outwardly from said axis and forwardly at a tip region initial angle of attack toward an intermediate position while drawing said cables forwardly, said electrosurgical cutting leading portion defining a cutting profile of maximum effective diametric extent in correspondence with said intermediate position, and subsequently being drivably extendable while being drawn in contraction toward said axis at tip region inwardly directed full pursing angles of attack by pursing stress at said cable assembly to a capture position; and

a control assembly having a drive portion in driving engagement with said capture component and actuable to drive said capture component forward portion from said initial position into said capture position, said control assembly effecting the electrosurgical energization of said pursing cable assembly, and being configured to effect a loading of said tensionable cables to derive a said pursing stress which progressively increases toward a higher value to establish corresponding tip region transition pursing angles of attack which commence prior to attainment of said intermediate position and prior to commencement of said tip region full pursing angles of attack.

2. The apparatus of claim 1 in which:

said control assembly is configured to effect said loading of said tensionable cables by progressively inhibiting the movement of said cable terminator with said cables when drawn forwardly.

3. The apparatus of claim 1 in which:

said cable terminator is movable forwardly with said cables along a support member;

said control assembly comprises a stop member positioned upon said support member to engage said cable terminator to block the movement thereof, and a

resilient component positioned intermediate said stop member and said cable terminator, engagable with said cable terminator to effect said derivation of said pursing stress which progressively increases.

4. The apparatus of claim 3 in which:

said control assembly resilient component comprises one or more springs.

5. The apparatus of claim 4 in which:

said cutting profile maximum effective diametric extent is from about 10mm to about 15mm; and

said spring exhibits a spring rate of about 7 to 10 pounds per inch.

6. The apparatus of claim 5 in which:

said spring is a compression spring having a length of about 0.25 inch.

7. The apparatus of claim 4 in which:

said cutting profile maximum effective diametric extent is about 20mm or more; and

said spring exhibits a spring rate of about 10 to 15 pounds per inch.

8. The apparatus of claim 7 in which:

said spring is a compression spring having a length of about 0.25 inch.

9. The apparatus of claim 1 in which:

said capture component forward portion is configured to define a tissue recovery cage when said capture position is attained;

said control assembly is configured to derive said pursing stress to define a said tissue recovery cage exhibiting an aspect ratio of said maximum effective diametric extent to its length along said longitudinal axis of from about 1:1 to about 1:1.5.

10. The apparatus of claim 4 in which:

said spring exhibits a spring constant effective to maximize the effective diametric extent of said cutting profile when said capture component forward portion is at or adjacent said intermediate position.

11. The apparatus of claim 10 in which:

said spring is a compression spring having a length effective to maximize the effective diametric extent of said cutting profile when said capture component forward portion is at or adjacent said intermediate position.

B. 12. The method for isolating and retrieving a tissue volume, comprising the steps of:

(a) providing a delivery member having an interior channel extending from a proximal portion along a longitudinal axis to a forward region having a distal end;

(b) providing a capture component positioned at said delivery member forward region, having a forward portion comprised of a plurality of cable supports having tip portions of given width supporting a forwardly disposed pursing cable assembly including one or more electrically conductive tensionable cables extending from said tip portions along said interior channel and arranged at said tip portions to define an electrosurgical cutting edge, said forward portion having an initial position substantially within said interior channel;

(c) positioning said delivery member at an operative location wherein said distal end is located in adjacency with said tissue volume;

(d) electrosurgically exciting said capture component cables to form a cutting arc at said electrosurgical cutting edge;

(e) driving said capture component from said initial position to effect said deployment of said cable supports at an initial angle of attack and to expansively move said electrosurgical cutting edge toward an intermediate position corresponding with a cutting profile defining a maximum effective diametric extent;

(f) loading said cables with a pursing stress which progressively increases to progressively alter the angle of attack of said cable support tip portions defining a curvature toward said longitudinal axis as said intermediate position is approached to an extent facilitating the forward movement of said cable supports;

(g) loading said cables with a pursing value of tensile stress effective to converge said tip portion to a capture position defining a tissue recovery cage substantially encapsulating said tissue volume;

(h) terminating said electrosurgical excitation; and

(i) removing said delivery member forward region from said operative location.

13. The method of claim 12 in which:

said step (f) carries out the loading of said cables to have progressively altered the angle of attack of said tip portion from said initial angle of attack substantially to a parallel orientation with said longitudinal axis at said intermediate position.

14. The method of claim 12 in which:

said step (f) is carried out by spring biasing said cables.

15. The method of claim 14 in which:

said step (e) maximum effective diametric extent is from about 10mm to about 15mm; and

said spring biasing is carried out at a spring rate of about 7 to 10 pounds per inch.

16. The method of claim 14 in which:

said step (e) maximum effective diametric extent is about 20mm or more; and

said spring biasing is carried out at a spring rate of about 10 to 15 pounds per inch.

17. The method of claim 12 in which:

said step (f) loads said cables in a manner defining a said curvature as having progressively decreasing radii.

18. A system for retrieving a tissue volume, comprising:

a cannula assembly with an interior channel extending from a proximal portion along a longitudinal axis to a forward region;

a capture component positioned at said cannula assembly forward region, having a forward portion with a plurality of cage defining leafs extending to generally flat tip regions configured to mount a pursing cable assembly having a plurality of cables energizable to define an electrosurgical cutting leading edge at said tip regions, said cables extending along said cannula assembly interior channel to a connection with a cable terminator, said capture component being drivable to extend said leafs from an initial position generally within said interior channel at an initial attack angle outwardly and forwardly toward an intermediate orientation corresponding with a maximum effective diameter said cables being loadable in tension to effect a pursing of said leaf tip regions to converge toward said longitudinal axis to exhibit a capture orientation;

a support assembly configured to support said cable terminator for slideable forward movement under drive from said cables;

a drive assembly having a drive member drivably engaged with said capture component and extending to a driven portion and a motor driver assembly energizable to impart drive movement to said driven portion to effect application of drive to said capture component and exhibiting a stall condition upon attainment by said capture component of said capture orientation;

a cable stop located to effect blockage of said slideable forward movement of said cable terminator at a position corresponding substantially with said capture component intermediate orientation;

a pre-tensioning assembly configured to assert a modulated pretension upon said cables at said terminator component prior to said blockage thereof effective to provide a progressive alteration of said initial attack angle toward said longitudinal axis to inhibit a premature derivation of said stall condition; and

a control assembly controllable to effect said energization of said motor driver and said pursing cables, and to de-energize said pursing cables and said motor driver in response to said stall condition.

19. The system of claim 18 in which:

said pre-tensioning assembly comprises a resilient component.

20. The system of claim 19 in which:

said resilient component comprises at least one spring.

21. The system of claim 20 in which:

said spring is a compression spring positioned intermediate to said cable stop and said cable terminator.

22. The system of claim 20 in which:

said maximum effective diameter is from about 10mm to about 15mm; and

said spring exhibits a spring rate of about 7 to 10 pounds per inch.

23. The system of claim 22 in which:

said spring is a compression spring positioned intermediate to said cable stop and said cable terminator, and has a length of about 0.25 inch.

24. The system of claim 20 in which:

said maximum effective diameter is about 20mm; and

said spring exhibits a spring rate of about 10 to 15 pounds per inch.

25. The system of claim 24 in which:

said spring is a compression spring positioned intermediate to said cable stop and said cable terminator, and has a length of about 0.25 inch.

26. The system of claim 18 in which:

said capture component defines a tissue recovery cage when at said capture orientation; and

said pre-tensioning assembly is configured to define said tissue recovery cage as exhibiting an aspect ratio of said maximum effective diameter to its length along said longitudinal axis of from about 1:1 to about 1:1.5.